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S P E C I F I C A T I O N

OF

JAMES PALMER BUDD.

MANUFACTURE OF COKE.

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Manufacture of Coke.

BUDD'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES PALMER BUDD, of the Ystalyfera Iron Works, Swansea, Merchant, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her
5 Royal Letters Patent under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the Eleventh day of June, One thousand eight hundred and fifty, in the thirteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Palmer Budd, my eñors, adñors, and assigns, Her especial licence,
10 full power, sole privilege and authority, that I, the said James Palmer Budd, my eñors, adñors, and assigns, or such others as I, the said James Palmer Budd, my eñors, adñors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within
15 England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "IMPROVEMENTS IN THE MANUFACTURE OF COKE;" in which said Letters Patent is contained a proviso that I, the said James Palmer Budd, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and
20 seal, to be inrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Budd's Improvements in the Manufacture of Coke.

NOW KNOW YE, that in compliance with the said proviso, I, the said James Palmer Budd, do hereby declare that the nature of my Invention, and the manner in which the same is to be performed, are fully described in and by the following statement thereof, that is to say :—

The coals of this country may be broadly divided into two great varieties, 5 the first variety of which will, with more or less facility on the application of heat, run or cake together, and which I call caking coal; and the second variety of which will not, on the application of heat, run together and cake, but on the contrary, each piece either remains separate and distinct or splits into small pieces; and which second variety I will call non-caking coal. 10

Now it is well known that large quantities of coal of the non-caking quality are almost valueless when reduced below a certain size; and the main object of my Invention is to make this almost valueless non-caking coal available for conversion into coke. To do this, I take a quantity of non-caking coal, and I take another quantity of the most caking coal I can procure, and I inti- 15 mately mix these quantities of coal together in the necessary proportions, and having crushed any lumps that may be therein, I subject the mixture to the ordinary process of caking bituminous coal, and the result will be a good serviceable coke, the bituminous matter of the caking coal, when liberated by heat in the coke furnace, acting during the process on the particles of the 20 non-caking coal with which it is in contact, and cementing the whole into a homogeneous coke. I prefer to use a pug mill similar to that used for mixing mortar, to grind the two sorts of coal, and to mix them intimately together, or rolls may be used for the purposes, either with or without grooves; or if the two varieties of coal are in a fine state of division, they may be mixed toge- 25 ther without grinding, or the larger pieces may be separated by sieves, so that in all cases the object be obtained which is essential to my Invention of having an intimate mixture of the two opposite qualities of coal, and that the lumps or knobs shall be crushed, reduced, or taken out. At the same time I would observe, that it is not so important to crush the lumps of the caking coal as 30 those of the non-caking, as the former have a tendency to open and dissolve on the application of heat. I do not confine myself to any description of furnace or oven, or to any mode of coking. In the process of coking, small bituminous coal is entirely applicable to my Invention; but that process will be most effective that will most quickly bring the charge into a clear red heat. 35 The ordinary modes pursued in coking small bituminous coal, as to the quantity of air to be admitted, the period at which the air is to be shut off, and for the taking out the charge, will be applicable to the coking of the mixed and reduced caking and non-caking coals. I cannot give rules for distinct

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proportions of caking and non-caking coal to be used in all cases to produce the best coke, because such proportions can only be learnt from practice, as they will depend on the strength of the caking property in the binding coal, and also on the description of non-caking coal that is used, some sorts being
 5 more refractory and difficult to cement into coke than others; but what I recommend is, that when it is required to make a coke of a mixture of caking and non-caking coal, that they be used at first in equal proportions; and that if the coke does not present a homogeneous appearance at the fracture, a further proportion of caking coal be added, until the non-caking coal used be found
 10 to be uniformly acted on and cemented by the bituminous matters, whilst, if the coke be spongy and porous, a further proportion of non-caking coal may be added. I would observe, that every variety of non-caking coal is suitable for this process of coking up to the most refractory description of anthracitic and anthracite coal.

15 What I claim as my Invention is the coking of non-caking coal by the mixture of caking coal, the two sorts being intimately mixed together, and the size reduced by crushing, grinding, or by abstraction of the lumps by sieves or other means.

In witness whereof, I, the said James Palmer Budd, have hereunto set
 20 my hand and seal, this Twenty-fifth day of November, in the year of our Lord One thousand eight hundred and fifty.

J. PALMER (L.S.) BUDD.

AND BE IT REMEMBERED, that on the Twenty-fifth day of November, in the year of our Lord 1850, the aforesaid James Palmer Budd came before
 25 our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Enrolled the Ninth day of December, in the year of our Lord One
 30 thousand eight hundred and fifty.

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